

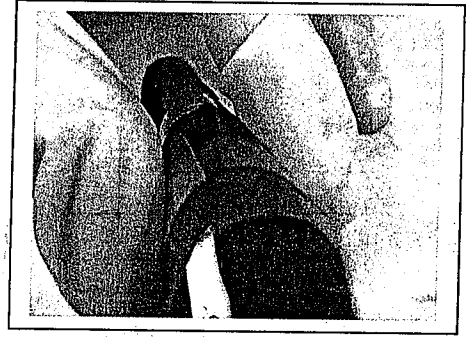


可撓式鈣鈦礦(Perovskite)太陽能電池及其製作方法

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市場及需求

近年來，發展低碳排放與清潔可再生之綠色替代能源已成為人類社會永續發展之關鍵課題。由於太陽每小時於地球的輻射能即超過全球一年的能源使用量，加上其幾近無限可取(大於地球壽命)和不受地域限制特性，使得太陽能為相關能源發展技術中最為受到矚目。日前的一項市場調查研究更指出全球太陽能電池市場預計於 2016 年到 2020 年將以 16% 的年複合增長率增長，預計於 2022 年時達到一超過 4000 億美元的市場規模。

技術摘要(含成果):

本發明提供一種軟性鈣鈦礦太陽能電池，其包含使用低溫溶液製程製備 n-i-p 型薄膜電池之電子傳輸層，此電子傳輸層係以金屬氧化層及有機薄膜結合而成。另外，也提供一種運用彈性體做為封裝材料，同時可將元件整合至織物之方法。

優勢

本發明之軟性鈣鈦礦太陽能電池具備了輕巧、可撓曲性、成本低、提升在水中及大氣下之穩定性、低溫溶液製程以及元件易整合至其他基材等優勢，另外，在光電特性上擁有高載子遷移率與效率等優勢。

競爭產品

目前於太陽能電池市場上市佔率最高的仍為傳統的無機太陽能電池如 Si、CdTe、CIGS 等。其電池模組轉換效率可達 16% 以上並具有超過 20 年的良好元件壽命。然而此類高結晶度無機材料並不具有延展性，並且受限於其繁瑣與高溫的製備過程，使得無機太陽能電池普遍無法應用於軟性基材上或發展成可撓式的柔性電池。

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FLEXIBLE PEROVSKITE SOLAR CELL AND MANUFACTURING METHOD THEREOF

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Market Needs

In recent years, the growth of low-carbon emissions, eco-friendly and renewable alternative energy has become a key issue in the sustainable development of human society. The solar energy have received most attention in the development of energy-related technologies due to the fact that the solar energy provide for the Earth in one day is more than the world used in one year, and also it's almost unlimited (greater than Earth's life) and geographical restrictions. A recent market research also pointed out that the global market of solar cells is expected to grow at a compound annual growth rate of 16% by 2016 to 2020, and is expected to reach a market size of more than \$ 400 billion by 2022.

Our Technology:

The present invention provides a flexible perovskite solar cells comprising metal oxide/organic layer as low-temperature solution-processed electron transport layer (ETL) for thin film cells with an n-i-p structure. Furthermore, the present invention also provides an method utilizing an elastomer for effortless integration of a completed device stack onto a textile and device encapsulation.

Strength:

The flexible perovskite solar cells of present invention have the advantages of lightness, flexibility, low cost, improvement of the stability under water and atmospheric conditions, low-temperature solution process and deployable capabilities; in addition, the photoelectric characteristics, exhibit high carrier mobility, efficiency and other advantages.

Competing Products:

At present, the highest market share in the solar cell market is still the traditional inorganic solar cells such as Si, CdTe, CIGS and so on. The battery module conversion efficiency of up to 16% and more than 20 years of good component life. However, such high crystallinity inorganic materials are not ductile, and are limited by their complexity and high temperature preparation process, making the inorganic solar cells generally can not be applied to soft substrates or developed into flexible batteries.

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